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Classification of the Forest Vegetation of Colorado by Habitat Type and Community Type

ORIGINAL

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Forest vegetation classified by habitat types and community types in Colorado are tabulated. Fifteen series and 161 habitat and community types are identified. However, the habitat and community types have been grouped into fewer categories, having similar characteristics or synonymous names. Included are the name, location, relative site, successional status, tree and principal undergrowth associates, and the authority.

Keywords: Vegetation classification, habitat type, community type

Classification of forest land into units of similar biological potential is helpful for land managers, planners, and researchers during the decisionmaking process. Furthermore, if the capabilities and limitations of forest land units cannot be identified, there is no basis for selecting areas most useful for research or the geographical extent to which research findings can be extrapolated. Classification of forest lands in Colorado into habitat types or community types was started in the late 1970s. Although classification has not been completed on all national forest lands, this report provides a handy tabulation and brief description of the forest habitat types and community types that have been identified (table 1). More detailed descriptions and the associated management implications of each unit are given in the publications cited in table 1. Readers who are interested in cross reference to similar habitat types elsewhere are directed to Alexander (1985).

Because terminology in ecology is not uniformly used or understood, the terms and concepts used in this report are defined here.

"Climax" vegetation is that which has attained a steady state with its environment; species of climax vegetation successfully maintain their population sizes indefinitely over time. Tansley (1935) proposed recognizing climatic, edaphic, and physiographic climaxes and discussed fire and biotic climaxes. Daubenmire (1952) used this approach, with modifications, in his classification of forest vegetation in the northern Rocky Mountains. Daubenmire (1968), Daubenmire and Daubenmire (1968), Hoffman and Alexander (1976), and Pfister et al. (1977) further elaborated on the definition, usage, and limitations of the polyclimax concept.

"Climatic climax" vegetation develops on "normal" regional topography with deep, well-drained, well-developed soils. Where soils or topography exert sufficient influence to produce self-perpetuating vegetation distinct from the climatic climax, the terms "edaphic climax" and "topographic climax," respectively, are used to describe the steady-state vegetation. Where special topographic conditions also favor the development of edaphic conditions distinct from the "normal," the term "topo-edaphic climax" often is used in descriptions of the resulting steady-state vegetation. Where recurring disturbance, such as grazing or fire, exerts a predominant influence on the composition or structure of steady-state vegetation, the term "disclimax" is used. Without the disturbing factor, or factors, the vegetation may revert to the primary climax. "Seral" vegetation is that which has not attained a steady state; current populations of some species are being replaced by others.

In some instances, trends toward the "climax" vegetation can be identified; in others, these trends are not evident; and in still others, the vegetation may not revert to the climax. However, if trends in succession within seral communities are not known or cannot be determined, there is no basis for recognizing habitat types in those areas. These circumstances are the basis for "com-

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munity types." Conversely, if "seral" communities do not revert to climax, they usually are treated as stable plant communities (climax).

"Habitat type" is the basic unit in classifying lands based on potential (climax) natural vegetation. A habitat type represents, collectively, all parts of the landscape that support, or have the potential of supporting, the same primary climax vegetation. The climax vegetation upon which the classification is based is called a "plant association." The first level of the classification is the "series," which is the grouping of all plant associations having the same overstory (climax) dominants. All habitat types with *Pinus ponderosa* as the potential climax dominant are grouped into the *Pinus ponderosa* series. The series is more than an artificial grouping of habitat types, because there is an ecologic basis for grouping habitat types into series. For example, *Juniperus scopulorum* occupies areas that are warmer and drier than areas where *Pinus ponderosa* is climax. Continuing higher into the mountains of Colorado, *Pseudotsuga menziesii*, *Populus tremuloides*, *Pinus contorta*, *Picea engelmannii*, *Abies lasiocarpa*, and *Pinus aristata* successively become the dominant species.

Habitat types within a series are distinguished on the basis of undergrowth "unions," the smallest "structural units" of the vegetation. Each "union" consists of one or more undergrowth species that have similar microenvironmental requirements. The indicator species for each habitat type may vary from place to place, but the variation is within narrow limits. Theoretically, good indicator species are those confined, or nearly confined, to a particular habitat type. Practically, such species are rare and difficult to observe. The best indicator undergrowth species are those that are relatively common, so they can be observed readily, have high constancy in the particular habitat type, and have limited distribution in other habitat types. The occurrence of one or more undergrowth indicator species usually is more reliable than the occurrence of just one species. Species found in numerous habitat types have wide occurrence and little indicator significance.

The term "community type" has been used to identify vegetation which may be (1) climax but about which there is uncertainty, (2) seral but the trends toward climax are not evident, or (3) the recognized plant community in place varies at any given time. Community types should not be considered the equivalent of habitat types. Community types have one or more overstory dominants and characteristic undergrowth species. The overstory dominants are usually long-lived, seral vegetation that may be self-perpetuating because of repeated disturbance that prevents or slows down the succession of climax vegetation.

Some items in table 1 need further clarification.

1. Habitat types and community types listed are restricted to those identified by investigators using methodology developed by Daubenmire (1952) and modified by others.

2. The description of the site (i.e., warm dry, cool dry, etc.) refers only to the series and location and, therefore, is relative. A warm dry *Pinus ponderosa* site is not the same as a warm dry *Abies lasiocarpa* site.

3. In those habitat types where more than one phase is recognized, the typal phase is listed first, followed by the other phases. "Phase" is a subdivision of a habitat type representing a characteristic variation in understory vegetation, usually associated with soil and other environmental conditions.

4. Synonyms of habitat types and closely related habitat types (which may be the same habitat type) are included within brackets.

5. Under the heading "Principal undergrowth species," the naming undergrowth species is listed first, followed by shrubs, graminoids, and forbs.

6. The following information still is needed to complete classification of forest vegetation in Colorado.

a. Coniferous habitat and community types on the Pike National Forest.

b. Aspen habitat and community types on the Rio Grande and San Juan National Forests.

c. Coniferous habitat and community types are available for only the San Carlos Ranger District on the San Isabel National Forest; and the Conejos and Alamosa Districts, and Sangre de Cristo Mountains portion of the Del Norte District on the Rio Grande National Forest.

d. Coniferous and aspen habitat and community types on the Grand Mesa and Uncompahgre National Forests. Work to classify these forests is underway. Habitat types listed for these forests, therefore, are tentative.

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Table 1.—Habitat types and community types of forest vegetation in Colorado

Habitat type or community type	Location	Site	Successional status	Tree associates	Principal undergrowth species	Authority
			Quercus gambelii series			
Quercus gambelii/ Amelanchier alnifolia H.T.	Gunnison National Forest	Warm dry	*Q. gambelii* climax	*Populus tremuloides*	*A. alnifolia* *Berberis repens* *Prunus virginiana* *Symphoricarpos oreophilus* *Carex geyeri*	Komarkova et al.[1]
Quercus gambelii/ Pachistima myrsinites H.T. [*Q. gambelii/ Prunus virginiana* H.T.]	Gunnison National Forest	Warm dry	*Q. gambelii* climax	*P. tremuloides*	*P. myrsinites* *B. repens* *P. virginiana* *C. geyeri* *Smilacina stellata*	Komarkova et al.[1]
Quercus gambelii/ Prunus virginiana H.T. [*Q. gambelii/ Symphoricarpos oreophilus* H.T.] [*Q. gambelii-P. virginiana/ Amelanchier utahensis-Pachistima myrsinites* H.T.]	Gunnison and White River National Forests	Warm dry	*Q. gambelii* climax	*P. tremuloides*	*P. virginiana* *A. utahensis* *P. myrsinites* *S. oreophilus* *Festuca thurberi* *C. geyeri* *Conioselinum scopulorum*	Hess and Wasser[2] Komarkova et al.[1]
Quercus gambelii/ Symphoricarpos oreophilus H.T. [*Q. gambelii/S. oreophilus-Carex geyeri* H.T.]	Grand Mesa, Routt, Uncompahgre, and White River National Forests	Warm dry	*Q. gambelii* climax	*P. tremuloides*	*S. oreophilus* *A. alnifolia* *P. virginiana* *C. geyeri* *Wyethia amplexicaulis*	Hess and Wasser[2] Hoffman[3] Hoffman and Alexander 1980, 1983
			Juniperus osteosperma series			
Juniperus osteosperma/ Cercocarpus montanus H.T. [*J. osteosperma/C. montanus-Peraphyllum ramosissimum* H.T.]	Southwestern White River National Forest	Warm dry	*J. osteosperma* climax	*Pinus edulis*	*C. montanus* *P. ramosissimum* *Q. gambelii* *S. oreophilus*	Hess and Wasser[2]
Juniperus osteosperma/ Symphoricarpos oreophilus H.T. [*J. osteosperma/ Berberis fremontii* H.T.]	Gunnison National Forest	Warm very dry	*J. osteosperma* climax	*P. tremuloides*	*S. oreophilus* *B. fremontii* *Bromus tectorum* *Poa interior* *Stipa pinetorum* *C. geyeri*	Komarkova et al.[1]
			Juniperus scopulorum series			
Juniperus scopulorum/ Artemisia tridentata H.T.	Northern Roosevelt National Forest	Warm dry	*J. scopulorum* climax	*P. ponderosa* *P. menziesii*	*A. tridentata* *Ribes cereum* *Elymus ambiguus* *Oryzopsis hymenoides*	Hess and Alexander 1986
Juniperus scopulorum/ Cercocarpus montanus H.T.	Roosevelt National Forest	Warm very dry	*J. scopulorum* climax	*Pinus ponderosa* *Pseudotsuga menziesii*	*C. montanus* *Agropyron griffithsii* *Poa sandbergii* *Artemisia frigida* *Potentilla fissa*	Hess and Alexander 1986
Juniperus scopulorum/ Purshia tridentata H.T.	Northern Roosevelt National Forest	Warm dry	*J. scopulorum* climax	*P. ponderosa* *P. menziesii*	*P. tridentata* *Opuntia polyacantha* *A. griffithsii* *Carex rossii* *Helianthus pumilus*	Hess and Alexander 1986
Juniperus scopulorum/ Agropyron spicatum H.T.	Middle Park, Arapaho National Forest	Warm dry	*J. scopulorum* climax	Usually pure stands	*A. spicatum* *A. tridentata* *Bouteloua gracilis* *O. hymenoides* *Sitanion hystrix* *Mertensia lanceolata*	Tiedeman et al. 1987
			Pinus edulis series			
Pinus edulis-Juniperus spp./ *Cercocarpus montanus* H.T. [*P. edulis-Juniperus osteosperma/ C. montanus* H.T.] [*P. edulis-Juniperus scopulorum* H.T.]	Grand Mesa, Uncompahgre, and White River National Forests	Warm very dry	*P. edulis* co-climax with *J. osteosperma* *J. scopulorum* *Juniperus monosperma*	*J. osteosperma* *J. scopulorum* *J. monosperma*	*C. montanus* *Q. gambelii* *S. oreophilus* *O. hymenoides*	Hess and Wasser[2] Hoffman[3] Hoffman and Alexander 1983

Pinus edulis/ *Quercus gambelii* H.T. [*P. edulis/Q. gambelii-* *Carex geyeri* H.T.]	White River National Forest	Warm dry	*P. edulis* climax	*J. osteosperma* *P. menziesii*	*Q. gambelii* *A. utahensis* *S. oreophilus* *C. geyeri*	Hess and Wasser[2]
			Populus angustifolia series			
Populus angustifolia/ *Amelanchier alnifolia* H.T. (Riparian forest) [*P. angustifolia/A. alnifolia-* *Smilacina stellata* H.T.]	White River National Forest	Warm moist	*P. angustifolia* climax	*Acer negundo* *Populus balsamifera* *J. scopulorum* *P. menziesii*	*A. alnifolia* *Acer glabrum* *S. oreophilus* *Galium* spp. *S. stellata*	Hess and Wasser[2]
Populus angustifolia/ *Salix exigua* H.T. (Riparian forest)	Gunnison and Roosevelt National Forests	Warm moist	*P. angustifolia* climax	*Alnus tenuifolia* *J. scopulorum* *P. ponderosa* *Picea pungens* *P. tremuloides*	*S. exigua* *A. glabrum* *Betula frontinalis* (co-dom GNF) *Rosa woodsii* *Calamagrostis canadensis* *S. stellata* *Vicia americana*	Hess and Alexander 1986 Komarkova et al.[1]
			Pinus ponderosa series			
Pinus ponderosa/ *Arctostaphylos uva-ursi* H.T.	Wet Mountains, San Isabel National Forest	Warm dry	*P. ponderosa* climax	*P. menziesii*	*A. uva-ursi* *Q. gambelii* *Festuca arizonica* *Muhlenbergia montana* *Carex* spp.	DeVelice et al. 1986
Pinus ponderosa/ *Artemisia tridentata* H.T.	Gunnison National Forest	Warm dry	*P. ponderosa* climax	*P. menziesii*	*A. tridentata* *B. repens* *P. tridentata* *F. arizonica* *Koeleria cristata* (*K. micrantha*) *Carex* spp. *Lupinus argenteus*	Komarkova et al.[1]
Pinus ponderosa/ *Cercocarpus montanus* H.T.	Pike and Roosevelt National Forests	Warm very dry	*P. ponderosa* climax	Usually pure stands	*C. montanus* *O. polyacantha* *Rubus trilobata* *C. rossii* *A. frigida* *Geranium fremontii*	Hess and Alexander 1986 Radloff 1983
Pinus ponderosa/ *Purshia tridentata* H.T.	Roosevelt National Forest	Warm dry	*P. ponderosa* climax	*J. scopulorum* *P. menziesii*	*P. tridentata* *M. montana* *C. rossii* *G. fremontii* *Penstemon virens*	Hess and Alexander 1986
Pinus ponderosa/ *Quercus gambelii* H.T. [*P. ponderosa/Q. gambelii-* *Carex geyeri* H.T.] *Quercus gambelii* (typic) phase *Pinus edulis* phase *Festuca arizonica* phase	Grand Mesa, Rio Grande, San Isabel, San Juan, Uncompahgre, and White River National Forests	Warm dry	*P. ponderosa* climax	*J. scopulorum* *P. edulis* *P. menziesii*	*Q. gambelii* *S. oreophilus* *Juniperus communis* *F. arizonica* *K. cristata* *M. montana* *C. geyeri*	DeVelice et al. 1986 Hess and Wasser[2] Hoffman[3]
Pinus ponderosa/ *Ribes inerme* H.T. (Scree forest)	Rio Grande, San Isabel, and San Juan National Forests	Warm dry	*P. ponderosa* climax	*Pinus strobiformis* *P. menziesii*	*R. inerme* *Q. gambelii* *Muhlenbergia* spp.	DeVelice et al. 1986
Pinus ponderosa/ *Festuca arizonica* H.T. *F. arizonica* (typic) phase *Bouteloua gracilis* phase *Danthonia parryi* phase	Gunnison, Rio Grande, Pike, San Isabel, and San Juan National Forests	Warm to hot dry	*P. ponderosa* climax	*Juniperus* spp. *P. edulis* *P. menziesii*	*F. arizonica* *B. gracilis* *D. parryi* *M. montana* *A. frigida* *Erigeron* spp.	DeVelice et al. 1986 Komarkova et al.[1] Radloff 1983
Pinus ponderosa/ *Hesperochloa kingii* H.T.	Roosevelt National Forest	Warm dry	*P. ponderosa* climax	*J. scopulorum* *P. menziesii*	*H. kingii* *R. cereum* *G. fremontii*	Hess and Alexander 1986
Pinus ponderosa/ *Muhlenbergia montana* H.T. [*P. ponderosa-* *Pseudotsuga menziesii/* *M. montana* H.T.]	Pike and Roosevelt National Forests	Warm dry	*P. ponderosa* climax or co-climax *with* *P. menziesii*	*J. scopulorum* *P. menziesii* *Pinus flexilis*	*M. montana* *R. cereum* *A. griffithsii* *F. arizonica* *A. frigida*	Hess and Alexander 1986 Radloff 1983
Pinus ponderosa/ *Oryzopsis hymenoides* H.T. (Sand hills)	Rio Grande National Forest	Warm very dry	*P. ponderosa* climax	*J. monosperma*	*O. hymenoides* *Schizachyrium scoparium* *Poliomintha incana*	DeVelice et al. 1986

Pinus ponderosa *Poa pratensis* H.T. [*P. ponderosa* Riparian H.T.]	Rio Grande, San Isabel, and San Juan National Forests	Cool to warm moist	*P. ponderosa* climax	*P. angustifolia* *A. negundo* *A. tenuifolia*	*P. pratensis* *Juncus* spp. *Galium* spp. *Iris missouriensis*	DeVelice et al. 1986
Pinus ponderosa *Carex rossii* H.T.	Roosevelt National Forest	Warm dry	*P. ponderosa* climax	Usually pure stands	*C. rossii* *J. communis* *M. montana* *Mertensia lanceolata*	Hess and Alexander 1986
			Pseudotsuga menziesii series			
Pseudotsuga menziesii *Berberis repens* H.T.	Grand Mesa and Uncompahgre National Forests	Warm dry	*P. menziesii*	*P. tremuloides*	*B. repens* *P. myrsinites* *S. oreophilus* *C. geyeri*	Hoffman[3]
Pseudotsuga menziesii *Clematis pseudoalpina* H.T.	Pike National Forest	Warm moist	*P. menziesii* climax	*P. ponderosa* *P. tremuloides*	*C. pseudoalpina* *J. communis* *Rosa* spp. *Calamagrostis purpurascens* *Carex* spp. *Fragaria* spp. *Saxifraga bronchialis* *Thalictrum fendleri* *Valeriana edulis*	Radloff 1983
Pseudotsuga menziesii *Holodiscus dumosus* H.T. (Scree forest)	Rio Grande, San Isabel, and San Juan National Forests	Warm dry	*P. menziesii* climax	*Abies concolor* *P. flexilis*	*H. dumosus* *Jamesia americana* *Ribes* spp.	DeVelice et al. 1986
Pseudotsuga menziesii *Jamesia americana* H.T.	Gunnison, Pike, and Roosevelt National Forests	Warm moist	*P. menziesii* climax	*P. ponderosa* *J. scopulorum*	*J. americana* *A. uva-ursi* *B. repens* *J. communis* *Physocarpus monogynus* *Fragaria ovalis* (*F. virginiana*) *P. fissa*	Hess and Alexander 1986 Komarkova et al.[1] Radloff 1983
Pseudotsuga menziesii *Pachistima myrsinites* H.T. [*P. menziesii*/*P. myrsinites*- *Carex geyeri* H.T.]	Grand Mesa, Gunnison, Routt, Uncompahgre, and White River National Forests	Warm dry	*P. menziesii* climax	*Pinus contorta* *Picea engelmannii* *P. tremuloides*	P. myrsinites *B. repens* *Q. gambelii* *S. oreophilus* *Vaccinium myrtillus*	Hess and Wasser[2] Hoffman[3] Hoffman and Alexander 1980, 1983 Komarkova et al.[1]
Pseudotsuga menziesii *Physocarpus monogynus* H.T.	Roosevelt National Forest	Warm moist to well-drained	*P. menziesii* climax	*P. ponderosa* *J. scopulorum*	*P. monogynus* *J. americana*	Hess and Alexander 1986
Pseudotsuga menziesii *Purshia tridentata* H.T. [*P. menziesii* *Arctostaphylos uva-ursi* H.T.]	Gunnison National Forest	Warm dry	*P. menziesii* climax	*Juniperus* spp.	*P. tridentata* *A. uva-ursi* *J. communis* *K. cristata* (*K. micrantha*) *Carex foenea*	Komarkova et al.[1]
Pseudotsuga menziesii *Quercus gambelii* H.T. *Q. gambelii* (typic) phase *Festuca arizonica* phase	Rio Grande, San Isabel, and San Juan National Forests	Warm dry	*P. menziesii* climax	*P. ponderosa* *P. edulis* *J. scopulorum*	*Q. gambelii* *A. alnifolia* *S. oreophilus* *F. arizonica* *M. montana* *C. geyeri*	DeVelice et al. 1986
Pseudotsuga menziesii *Symphoricarpos oreophilus* H.T.	Gunnison and White River National Forests	Warm dry	*P. menziesii* climax	*J. scopulorum* *P. flexilis*	*S. oreophilus* *B. repens* *P. myrsinites* *R. woodsii* *C. geyeri* *A. frigida* *Solidago* spp.	Hess and Wasser[2] Komarkova et al.[1]
Pseudotsuga menziesii *Festuca arizonica* H.T.	Rio Grande and San Juan National Forests	Warm dry	*P. menziesii* climax	*P. edulis* *P. ponderosa* *P. flexilis* *P. tremuloides*	*F. arizonica* *A. uva-ursi* *K. cristata* (*K. micrantha*) *M. montana* *Poa fendleriana*	DeVelice et al. 1986

Pseudotsuga menziesii ***Festuca idahoensis*** H.T.	Gunnison National Forest	Warm dry	*P. menziesii* climax	*Juniperus* spp.	*F. idahoensis* *R. cereum* *J. communis* *A. frigida*	Komarkova et al.[1]
Pseudotsuga menziesii ***Carex geyeri*** H.T.	Gunnison and Roosevelt National Forests	Cool dry	*P. menziesii* climax	*J. scopulorum*	*C. geyeri* *B. repens* *S. oreophilus* *R. woodsii* *Clematis occidentalis* *Erigeron* spp.	Hess and Alexander 1986 Komarkova et al.[1]
Pseudotsuga menziesii ***Carex rossii*** H.T.	Roosevelt National Forest	Warm dry to well-drained	*P. menziesii* climax	*P. ponderosa* *J. scopulorum*	*C. rossii* *P. monogynus* *Achillea lanulosa* *Campanula rotundifolia*	Hess and Alexander 1986
			Abies concolor series			
Abies concolor ***Acer glabrum*** H.T.	Rio Grande, San Isabel, and San Juan National Forests	Cool moist to well-drained	*A. concolor* climax or co-climax with *P. menziesii*	*P. menziesii* *P. pungens* *P. flexilis* *P. ponderosa* *P. engelmannii* *Abies lasiocarpa* *P. tremuloides*	*A. glabrum* *A. alnifolia* *B. repens* *J. americana* *P. monogynus* *P. myrsinites* *Erigeron eximius* *(E. superbus)*	DeVelice et al. 1986
Abies concolor ***Arctostaphylos uva-ursi*** H.T.	Rio Grande, San Isabel, and San Juan National Forests	Warm dry	*A. concolor* co-climax with *P. menziesii*	*P. ponderosa* *P. menziesii* *P. flexilis* *P. tremuloides*	*A. uva-ursi* *P. myrsinites*	DeVelice et al. 1986
Abies concolor ***Holodiscus dumosus*** H.T. (Scree forest)	Rio Grande, San Isabel, and San Juan National Forests	Cool dry	*A. concolor* co-climax with *P. menziesii*	*P. menziesii* *P. flexilis*	*H. dumosus* *J. americana* *Ribes* spp.	DeVelice et al. 1986
Abies concolor ***Quercus gambelii*** H.T.	Rio Grande, San Isabel, and San Juan National Forests	Warm dry	*A. concolor* co-climax with *P. menziesii*	*P. ponderosa* *P. menziesii* *P. flexilis* *P. tremuloides*	*Q. gambelii* *B. repens* *Rosa* spp. *S. oreophilus* *C. rossii*	DeVelice et al. 1986
Abies concolor ***Vaccinium myrtillus*** H.T.	Rio Grande, San Isabel, and San Juan National Forests	Cool dry to well-drained	*A. concolor* co-climax with *P. menziesii*	*P. menziesii* *P. ponderosa* *P. pungens* *P. flexilis* *P. engelmannii* *A. lasiocarpa*	*V. myrtillus* *A. glabrum* *A. alnifolia* *A. uva-ursi* *B. repens* *P. myrsinites* *Rubus parviflorus* *S. oreophilus*	DeVelice et al. 1986
Abies concolor ***Erigeron eximius*** H.T.	San Juan National Forest	Cool moist	*A. concolor* co-climax with *P. menziesii*	*P. menziesii* *P. pungens* *P. flexilis* *P. engelmannii* *A. lasiocarpa* *P. tremuloides*	*E. eximius* *(E. superbus)* *Bromus ciliatus* *Carex* spp. *Artemisia franserioides* *F. ovales* *(F. virginiana)* *Haplopappus parryi* *(Oreochrysum parryi)* *Lathyrus arizonica*	DeVelice et al. 1986
Abies concolor ***Galium triflorum*** H.T. (Riparian forests)	Rio Grande, San Isabel, and San Juan National Forests	Cool moist	*A. concolor* climax	*P. menziesii* *P. pungens* *J. scopulorum* *P. angustifolia*	*G. triflorum* *A. glabrum* *Q. gambelii* *P. virginiana* *P. pratensis* *T. fendleri*	DeVelice et al. 1986
Abies concolor Sparse H.T.	Rio Grande, San Isabel, and San Juan National Forests	Warm dry	*A. concolor* co-climax with *P. menziesii*	*P. menziesii* *P. ponderosa* *P. pungens* *P. flexilis* *J. scopulorum*	*S. oreophilus* (sparse)	DeVelice et al. 1986
			Picea pungens series			
Picea pungens/ ***Amelanchier alnifolia*** H.T. (Riparian forest) [***P. pungens/A. alnifolia-Cornus stolonifera-Carex geyeri*** H.T.]	Grand Mesa, Gunnison, Uncompahgre, and White River National Forests	Warm moist	*P. pungens* climax	*P. menziesii* *A. lasiocarpa* *P. angustifolia*	*A. alnifolia* *C. stolonifera* *R. woodsii* *C. geyeri* *F. thurberi* *Swida sericea* (co-dom)	Hess and Wasser[2] Hoffman[3] Komarkova et al.[1]

***Picea pungens/ Arctostaphylos uva-ursi* H.T.**	San Juan National Forest	Warm dry	*P. pungens* co-climax with *P. menziesii* *P. ponderosa*	*P. ponderosa* *P. menziesii* *A. concolor* *P. flexilis* *P. tremuloides*	*A. uva-ursi* *J. communis* *F. arizonica* *F. ovalis* (*F. virginiana*)	DeVelice et al. 1986
***Picea pungens/ Linnaea borealis* H.T.**	Rio Grande and San Juan National Forests	Cool moist to well-drained	*P. pungens* co-climax with *P. menziesii*	*P. menziesii* *A. concolor* *P. flexilis* *A. lasiocarpa* *P. engelmannii* *P. tremuloides*	*L. borealis* *P. myrsinites* *R. parviflorus* *Vaccinium* spp. *C. foenea* *E. eximius* (*E. superbus*) *T. fendleri*	DeVelice et al. 1986
***Picea pungens/ Festuca arizonica* H.T.**	Gunnison, Rio Grande and San Juan National Forests	Warm dry	*P. pungens* co-climax with *P. menziesii*	*P. menziesii* *A. concolor* *P. ponderosa* *P. flexilis* *P. tremuloides*	*F. arizonica* *R. woodsii* *D. parryi* *M. montana* *Carex* spp. *Erigeron* spp. *Fragaria* spp.	DeVelice et al. 1986 Komarkova et al.[1]
***Picea pungens/ Poa pratensis* H.T. (Riparian forest) [*P. pungens/Poa* spp. H.T.]**	Rio Grande, San Isabel, San Juan, and White River National Forests	Warm moist	*P. pungens* climax	*P. menziesii* *A. concolor* *P. tremuloides*	*Poa* spp. *A. alnifolia* *Rosa* spp. *Salix* spp. *E. eximius* (*E. superbus*)	DeVelice et al. 1986 Hoffman and Alexander 1983
***Picea pungens/ Carex foenea* H.T.**	Rio Grande and San Juan National Forests	Warm to cool moist	*P. pungens* co-climax with *P. menziesii*	*P. menziesii* *P. ponderosa*	*C. foenea* *Fragaria* spp. *Geranium richardsonii*	DeVelice et al. 1986
***Picea pungens/ Arnica cordifolia* H.T. (Riparian forest)**	Arapaho and Roosevelt National Forests	Cool moist	*P. pungens* climax	*P. menziesii* *P. tremuloides*	*A. cordifolia* *J. communis* *C. canadensis* *S. stellata*	Hess and Alexander 1986
***Picea pungens/ Erigeron eximius* H.T.**	Rio Grande, San Isabel, and San Juan National Forests	Cool moist	*P. pungens* co-climax with *P. menziesii*	*P. menziesii* *A. concolor* *P. flexilis* *P. engelmannii* *P. tremuloides*	*E. eximius* *Fragaria vesca* (*F. americana*) *H. parryi* (*O. parryi*)	DeVelice et al. 1986
***Picea pungens/ Swida sericea* H.T. (Riparian forest)**	Rio Grande, San Isabel, and San Juan National Forests	Cool moist	*P. pungens* co-climax with *P. menziesii*	*P. menziesii* *A. concolor*	*S. sericea* *G. triflorum* *G. richardsonii* *S. stellata*	DeVelice et al. 1986
			Pinus flexilis series			
***Pinus flexilis/ Arctostaphylos uva-ursi* H.T.**	San Isabel National Forest	Warm dry	*P. flexilis* climax or co-climax with *P. menziesii*	*P. menziesii* *P. engelmannii*	*A. uva-ursi* *J. communis*	DeVelice et al. 1986
***Pinus flexilis/ Juniperus communis* H.T.**	Arapaho, Grand Mesa, Roosevelt, Routt, and Uncompahgre National Forests	Warm dry	*P. flexilis* climax	*P. menziesii* *P. contorta*	*J. communis* *A. tridentata* *H. kingii* *C. rossii*	Hess and Alexander 1986 Hoffman[3] Hoffman and Alexander 1980
***Pinus flexilis/ Calamagrostis purpurascens* H.T.**	Arapaho and Roosevelt National Forests	Warm dry	*P. flexilis* climax	*P. contorta* *P. engelmannii*	*C. purpurascens* *Arenaria fendleri* *Erigeron* spp. *Pulsatilla ludoviciana*	Hess and Alexander 1986
***Pinus flexilis/ Saxifraga bronchialis* H.T. [*P. flexilis/ Cillaria austromontana* H.T.]**	Gunnison National Forest	Warm dry	*P. flexilis* climax	*P. contorta*	*S. bronchialis* *C. austromontana* *J. communis* *R. woodsii* *S. oreophilus* *F. thurberi*	Komarkova et al.[1]
***Pinus flexilis/ Trifolium desyphyllum* H.T.**	Arapaho and Roosevelt National Forests	Warm dry	*P. flexilis* climax	*P. engelmannii* *A. lasiocarpa*	*T. desyphyllum* *J. communis* *C. foenea* *A. fendleri*	Hess and Alexander 1986
			Populus tremuloides series and other *P. tremuloides*-dominated vegetation			
***Populus tremuloides/ Amelanchier alnifolia-Prunus virginiana* H.T. [*P. tremuloides/ A. alnifolia* H.T.]**	Grand Mesa, Gunnison, Routt, Uncompahgre, and White River National Forests	Warm dry	*P. tremuloides* climax or seral to unknown climax	Usually pure stands	*A. alnifolia* *P. virginiana* (co-dom) *R. woodsii* *S. oreophilus* *T. fendleri*	Hoffman[3] Johnston and Hendzel[4] Komarkova et al.[1]

Populus tremuloides/ Arctostaphylos uva-ursi H.T. (GNF), C.T.(P,SINF) (Scree forest GNF)	Gunnison, Pike, and San Isabel National Forests	Warm dry	*P. tremuloides* climax or seral to unknown or undetermined climax	Usually pure stands (GNF) *A. lasiocarpa* *P. contorta* (P,SINF) *P. ponderosa*	*A. uva-ursi* *S. oreophilus* *Bromus porteri* *C. foenea* *Carex geophila* *H. parryi* (*O. parryi*)	Komarkova et al.[1] Powell[5]
Populus tremuloides/ Berberis repens H.T.	Gunnison National Forest	Warm moist to dry	*P. tremuloides* climax or seral to unknown climax	Usually pure stands	*B. repens* *A. glabrum* *S. oreophilus*	Komarkova et al.[1]
Populus tremuloides/ Corylus comuta C.T.	Pike and San Isabel National Forests	Cool moist	*P. tremuloides* seral. Ultimate climax probably *P. menziesii* *P. pungens*	*P. menziesii* *P. pungens*	*C. comuta* *A. glabrum* *B. repens* *P. monogynus* *Aralia nudicaulis* *E. eximius* (*E. superbus*) *Viola canadensis*	Powell[5]
Populus tremuloides/ Juniperus communis C.T.	Pike and San Isabel National Forests	Cool dry	*P. tremuloides* seral. Ultimate climax probably *P. menziesii* *P. pungens*	*P. menziesii* *P. pungens* *P. contorta* *P. flexilis* *J. scopulorum*	*J. communis* *Poa* spp. *C. foenea* *F. ovalis* (*F. virginiana*) *G. richardsonii*	Powell[5]
Populus tremuloides/ Lonicera involucrata C.T.	Pike and San Isabel National Forests	Warm well-drained	*P. tremuloides* seral. Ultimate climax probably *A. lasiocarpa* *P. engelmannii*	*A. lasiocarpa* *P. engelmannii*	*L. involucrata* *Ribes montigenum* *R. woodsii* *B. porteri* *C. foenea* *F. ovalis* (*F. virginiana*) *G. richardsonii*	Powell[5]
Populus tremuloides/ Physocarpus monogynus C.T.	Pike and San Isabel National Forests	Warm moist	*P. tremuloides* seral to unknown ultimate climax	*P. contorta*	*P. monogynus* *S. oreophilus* *B. ciliatus* *Oryzopsis asperifolia* *Galium boreale*	Powell
Populus tremuloides/ Rubus parviflorus H.T.	Grand Mesa and Uncompahgre National Forests	Warm moist	*P. tremuloides* climax	Usually pure stands	*R. parviflorus* *A. glabrum* *V. myrtillus*	Hoffman[3]
Populus tremuloides/ Shepherdia canadensis C.T.	Pike and San Isabel National Forests	Warm dry	*P. tremuloides* seral to unknown ultimate climax	*P. contorta* *P. flexilis*	*S. canadensis* *B. repens* *J. communis* *L. involucrata* *B. porteri* *H. parryi*	Powell[5]
Populus tremuloides/ Symphoricarpos oreophilus H.T.; C.T. [*P. tremuloides/S. oreophilus-Carex geyeri* H.T.]	Grand Mesa, Gunnison, Routt, San Isabel, San Juan, Uncompahgre, and White River National Forests	Warm moist to well-drained	*P. tremuloides* climax or seral to ultimate unknown climax probably *P. menziesii* *A. concolor*	*P. menziesii* *A. concolor* *P. ponderosa* may be pure stands	*S. oreophilus* *A. alnifolia* *B. repens* *Poa* spp. *C. geyeri* *T. fendleri*	Hess and Wasser[2] Hoffman[3] Hoffman and Alexander 1980, 1983 Johnston and Hendzel[4] Komarkova et al.[1] Powell[5]
Populus tremuloides/ Vaccinium caespitosum C.T.	Pike and San Isabel National Forests	Cool dry	*P. tremuloides* seral to unknown ultimate climax	Usually pure stands	*V. caespitosum* *A. glabrum* *A. alnifolia* *R. woodsii* *Elymus glaucus* *O. asperifolia* *A. cordifolia*	Powell[5]
Populus tremuloides/ Vaccinium myrtillus C.T.	Pike and San Isabel National Forests	Cool dry	*P. tremuloides* seral. Ultimate climax probably *A. concolor* *P. engelmannii*	*A. concolor* *P. engelmannii*	*V. myrtillus* *B. repens* *P. monogynus* *Vaccinium scoparium* *A. cordifolia*	Powell[5]
Populus tremuloides/ Bromus ciliatus C.T.	Pike and San Isabel National Forests	Cool moist	*P. tremuloides* seral. Ultimate climax probably *A. lasiocarpa* *A. concolor*	*P. menziesii* *A. lasiocarpa* *A. concolor* *P. engelmannii*	*B. ciliatus* *A. uva-ursi* *J. communis* *F. thurberi* *Poa* spp. *G. boreale* *S. stellata*	Powell[5]

Populus tremuloides/ Calamagrostis canadensis C.T.	Pike and San Isabel National Forests	Cool moist	*P. tremuloides* seral. Ultimate climax probably *A. lasiocarpa* *P. engelmannii*	*P. engelmannii* *A. lasiocarpa* *P. contorta*	*C. canadensis* *R. woodsii* *P. pratensis* *Ligusticum porteri*	Powell[5]
Populus tremuloides/ Elymus glaucus C.T.	Pike and San Isabel National Forests	Cool wet	*P. tremuloides* seral. Ultimate climax probably *A. lasiocarpa* *P. engelmannii*	*A. lasiocarpa* *P. engelmannii*	*E. glaucus* *B. ciliatus* *P. pratensis* *Aconitum columbianum* *E. eximius* (*E. superbus*) *Heracleum sphondylium* *Mertensia ciliata*	Powell[6]
Populus tremuloides/ Festuca arizonica H.T. (Scree forest)	Gunnison National Forest	Warm dry	*P. tremuloides* climax or seral to unknown climax	Usually pure stands	*F. arizonica* *R. woodsii* *S. oreophilus*	Komarkova et al.[1]
Populus tremuloides/ Festuca thurberi H.T.; C.T. (P,SINF) [*P. tremuloides/F. thurberi-Carex geyeri* H.T.]	Arapaho, Grand Mesa, Gunnison, Pike, Roosevelt, San Isabel, Uncompahgre, and White River National Forests	Warm dry	*P. tremuloides* climax or seral to unknown ultimate climax	Usually pure stands. May contain *P. menziesii* *P. contorta* *P. engelmannii* *A. lasiocarpa*	*F. thurberi* *S. oreophilus* *C. geyeri* *Lathyrus leucanthus* *V. americana*	Hess and Alexander 1986 Hess and Wasser[2] Hoffman[3] Johnston and Hendzel[4] Komarkova et al.[1] Powell[5]
Populus tremuloides/ Poa pratensis C.T.	Pike and San Isabel National Forests	Cool moist	*P. tremuloides* seral. Ultimate climax unknown probably *A. concolor* *P. pungens*	*A. concolor* *P. pungens* *P. flexilis* *P. contorta*	*P. pratensis* *A. uva-ursi* *B. repens* *G. richardsonii* *V. americana* *V. canadensis*	Powell[6]
Populus tremuloides/ Carex geyeri H.T.	Arapaho, Grand Mesa, Roosevelt, Uncompahgre, and White River National Forests	Cool dry	*P. tremuloides* climax	Usually pure stands	*C. geyeri* *J. communis* *Fragaria* spp. *L. leucanthus*	Hess and Alexander 1986 Hoffman[3] Hoffman and Alexander 1983 Johnston and Hendzel[4]
Populus tremuloides/ Carex foenea C.T.	Pike and San Isabel National Forests	Cool moist	*P. tremuloides* seral. Ultimate climax unknown probably *A. concolor* *P. menziesii*	*P. menziesii* *A. concolor* *P. engelmannii*	*C. foenea* *R. woodsii* *Achillea millefolium* *V. americana* *V. canadensis*	Powell[5]
Populus tremuloides/ Heracleum sphondylium H.T. [*P. tremuloides/ Heracleum lanatum* H.T.]	Grand Mesa, Routt, Uncompahgre, and White River National Forests	Warm moist	*P. tremuloides* climax	Usually pure stands	*H. sphondylium* *B. ciliatus* *E. glaucus* *T. fendleri*	Hess and Wasser[2] Hoffman[3] Hoffman and Alexander 1980, 1983
Populus tremuloides/ Lathyrus leucanthus C.T.	Pike and San Isabel National Forests	Warm well-drained	*P. tremuloides* seral to unknown ultimate climax	Usually pure stands	*L. leucanthus* *R. woodsii* *B. porteri* *F. thurberi* *A. millefolium* *F. ovalis* (*F. virginiana*)	Powell[5]
Populus tremuloides/ Ligularia bigelovii C.T. [*P. tremuloides/ Senecio bigelovii* C.T.]	Pike and San Isabel National Forests	Cool moist	*P. tremuloides* seral. Ultimate climax unknown probably *P. menziesii* *P. pungens*	*P. menziesii* *P. pungens* *P. contorta*	*L. bigelovii* *J. communis* *R. woodsii* *F. ovalis* (*F. virginiana*) *G. boreale* *G. richardsonii*	Powell[6]
Populus tremuloides/ Ligusticum porteri H.T.;C.T.[7]	Pike, San Isabel, San Juan, and Uncompahgre National Forests	Warm moist	*P. tremuloides* climax or seral to unknown ultimate climax	Usually pure stands. May contain *A. concolor* *P. pungens*	*L. porteri* *S. oreophilus* *C. geyeri* *L. leucanthus* *T. fendleri* *V. americana*	Johnston and Hendzel[4] Powell[6]
Populus tremuloides/ Pteridium aquilinum H.T.; C.T.	Grand Mesa, Gunnison, Pike, Routt, San Isabel, Uncompahgre, and White River National Forests	Warm poorly-drained	*P. tremuloides* climax	Usually pure stands	*P. aquilinum* *S. oreophilus* *E. glaucus* *C. geyeri* *Melica subulata* *T. fendleri*	Hoffman[3] Hoffman and Alexander 1980, 1983 Komarkova et al.[1] Powell[6]

Populus tremuloides/ ***Thalictrum fendleri*** H.T.; C.T. [***P. tremuloides/T. fendleri-*** ***Carex geyeri*** H.T.] ***T. fendleri*** (typic) phase ***Delphinium barbeyi*** phase ***Ligusticum porteri*** phase	Arapaho, Grand Mesa, Gunnison, Pike, Roosevelt, Routt, San Isabel, San Juan, Uncompahgre, and White River National Forests	Warm moist	***P. tremuloides*** climax or seral to unknown ultimate climax	Usually pure stands	***T. fendleri*** ***S. oreophilus*** ***B. ciliatus*** ***E. glaucus*** ***D. barbeyi*** ***G. richardsonii*** ***L. leucanthus*** ***L. porteri*** ***L. argenteus***	Hess and Alexander 1986 Hess and Wasser[2] Hoffman[3] Hoffman and Alexander 1980, 1983 Komarkova et al.[1] Johnston and Hendzel[4] Powell[5]
Populus tremuloides/ ***Thermopsis divaricarpa*** C.T.	Pike and San Isabel National Forests	Warm dry	***P. tremuloides*** seral. Ultimate climax unknown. Probably ***A. lasiocarpa*** ***P. engelmannii***	***A. lasiocarpa*** ***P. engelmannii*** ***P. contorta***	***T. divaricarpa*** ***J. communis*** ***R. woodsii*** ***C. foenea*** ***A. millefolium*** ***F. ovalis*** (***F. virginiana***)	Powell[5]
Populus tremuloides/ ***Veratrum tenuipetalum*** H.T.	Routt and San Juan National Forests	Cool wet	***P. tremuloides*** climax	Usually pure stands	***V. tenuipetalum*** ***B. ciliatus*** ***L. porteri*** ***M. ciliata*** ***T. fendleri***	Hoffman and Alexander 1980 Johnston and Hendzel[4]
Pinus contorta series and other _P. contorta_-dominated vegetation						
Pinus contorta/ ***Juniperus communis*** H.T. [***P. contorta/*** ***Arctostaphylos uva-ursi*** C.T. (PNF)]	Gunnison, Pike, and Roosevelt National Forests	Cool dry	***P. contorta*** climax	Usually pure stands. May contain scattered ***P. menziesii*** ***P. engelmannii*** ***A. lasiocarpa***	***J. communis*** ***A. uva-ursi*** ***P. repens*** ***Rosa*** spp. ***A. cordifolia***	Hess and Alexander 1986 Komarkova et al.[1] Radloff 1983
Pinus contorta/ ***Shepherdia canadensis*** H.T.	Arapaho, Roosevelt, Routt, and White River National Forests	Warm to cool dry	***P. contorta*** climax	Usually pure stands	***S. canadensis*** ***A. uva-ursi*** ***J. communis*** ***Carex*** spp. ***A. cordifolia***	Hess and Alexander 1986 Hess and Wasser[2] Hoffman and Alexander 1980
Pinus contorta/ ***Vaccinium myrtillus*** H.T.(GNF); C.T.(PNF)	Gunnison and Pike National Forests	Cool dry	***P. contorta*** climax	Usually pure stands	***V. myrtillus*** ***A. uva-ursi*** ***J. communis*** ***P. myrsinites*** ***V. scoparium*** ***C. geyeri*** ***Arnica latifolia***	Komarkova et al.[1] Radloff 1983
Pinus contorta/ ***Vaccinium scoparium*** H.T.	Arapaho, Gunnison, and Roosevelt National Forests	Cool dry	***P. contorta*** climax	Usually pure stands. May contain scattered ***P. engelmannii*** ***A. lasiocarpa***	***V. scoparium*** ***J. communis*** ***R. woodsii*** ***C. geyeri*** ***A. cordifolia*** ***L. argenteus***	Hess and Alexander 1986 Komarkova et al.[1]
Pinus contorta/ ***Carex foenea*** H.T.	Gunnison National Forest	Warm dry	***P. contorta*** climax	Usually pure stands	***C. foenea*** ***K. cristata*** (***K. micrantha***) ***Poa nervosa*** ***F. ovalis*** ***F. virginiana***) ***V. edulis***	Komarkova et al.[1]
Pinus contorta/ ***Carex geyeri*** H.T. [***Populus tremuloides/*** ***Lathyrus leucanthus*** C.T. (GNF)]	Arapaho, Gunnison, Roosevelt, and White River National Forests	Cool dry	***P. contorta*** climax	Usually pure stands. May contain scattered ***P. engelmannii*** ***A. lasiocarpa*** ***P. tremuloides***	***C. geyeri*** ***B. repens*** ***J. communis*** ***P. myrsinites*** ***S. oreophilus*** ***A. cordifolia*** ***F. ovalis*** (***F. virginiana***)	Hess and Alexander 1986 Hess and Wasser[2] Komarkova et al.[1]
Picea engelmannii series						
Picea engelmannii/ ***Salix pseudolapponum*** H.T. [***P. engelmannii-*** ***Abies lasiocarpa/*** ***S. pseudolapponum*** H.T.]	Arapaho, Roosevelt, and White River National Forests	Cool wet	***P. engelmannii*** climax	***A. lasiocarpa*** ***P. contorta*** ***P. flexilis***	***S. pseudolapponum*** ***V. scoparium*** ***Geum rossii*** ***Polemonium pulcherrimum*** (***P. delicatum***)	Hess 1981 Hess and Wasser[2]
Picea engelmannii/ ***Vaccinium myrtillus-*** ***Polemonium pulcherrimum*** H.T. ***P. engelmannii phase*** ***Abies lasiocarpa phase***	Rio Grande, San Isabel, and San Juan National Forests	Cool dry to well-drained	***P. engelmannii*** climax or co-climax with ***A. lasiocarpa***	***A. lasiocarpa*** ***P. aristata***	***V. myrtillus*** ***P. pulcherrimum*** (***P. delicatum***) ***V. scoparium*** ***Luzula parviflora*** ***Ligularia amplectens***	DeVelice et al. 1986

Picea engelmannii *Heracleum sphondylium* H.T. (Riparian forest)	Rio Grande, San Isabel, and San Juan National Forests	Cool moist	*P. engelmannii* climax	*A. lasiocarpa* *P. tremuloides*	*H. sphondylium* *Lonicera involucrata* *B. ciliata* *E. eximius* (*E. superbus*) *M. ciliata* *V. canadensis*	DeVelice et al. 1986
Picea engelmannii *Saxifraga bronchialis* H.T. (Scree forest)	Rio Grande, San Isabel, and San Juan National Forests	Cool dry	*P. engelmannii* climax	*A. lasiocarpa* *P. tremuloides*	*S. bronchialis* *J. communis*	DeVelice et al. 1986
Picea engelmannii *Trifolium dasyphyllum* H.T.	Arapaho and Roosevelt National Forests	Cold moist	*P. engelmannii* climax	*A. lasiocarpa* *P. aristata*	*T. dasyphyllum* *Trisetum spicatum* *Pyrola chlorantha* *Sedum lanceolatum*	Hess and Alexander 1986
			***Abies lasiocarpa* series**			
Abies lasiocarpa *Juniperus communis* H.T. [*Populus tremuloides-* *Picea engelmannii* *Juniperus communis* C.T.] [*Populus tremuloides-* *Picea engelmannii* *Festuca idahoensis* C.T.]	Gunnison National Forest	Cool dry	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii* *P. contorta*	*J. communis* *A. uva-ursi* *Artemisia* spp.	Komarkova et al.[1]
Abies lasiocarpa *Pachistima myrsinites* H.T. [*Picea engelmannii-* *A. lasiocarpa*/ *P. myrsinites* H.T.]	White River National Forest	Warm dry to well-drained	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii* *P. menziesii*	*P. myrsinites* *L. borealis* *R. woodsii* *V. scoparium* *A. cordifolia*	Hess and Wasser[2]
Abies lasiocarpa *Rubus parviflorus* H.T.	Rio Grande and San Juan National Forest	Warm moist	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii* *P. menziesii* *P. tremuloides*	*R. parviflorus* *A. glabrum* *L. involucrata* *S. stellata* *T. fendleri*	DeVelice et al. 1986
Abies lasiocarpa *Salix glauca* H.T.	Gunnison National Forest	Cold wet	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii*	*S. glauca* *Carex* spp. *Acomastylis rossii* *P. pulcherrimum* (*P. delicatum*)	Komarkova et al.[1]
Abies lasiocarpa *Vaccinium myrtillus* H.T. [*A. lasiocarpa*/*V. myrtillus-* *Linnaea borealis* H.T.] [*A. lasiocarpa*/*V. myrtillus-* *Rubus parviflorus* H.T.] [*Pinus contorta*/*V. myrtillus* C.T. GNF] [*Populus tremuloides*/ *Danthonia intermedia* C.T. GNF] [*Populus tremuloides*/ *Festuca thurberi* C.T. GNF]	Grand Mesa, Gunnison, Rio Grande, San Juan, San Isabel, and Uncompahgre National Forests	Cool moist to well-drained	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii* *P. menziesii* *P. contorta* *P. tremuloides*	*V. myrtillus* *L. borealis* *R. parviflorus* *V. scoparium* *C. canadensis* *D. intermedia* *F. thurberi* *E. eximius* (*E. superbus*) *Solidago spathulata*	DeVelice et al. 1986 Hoffman[3] Komarkova et al.[1]
Abies lasiocarpa *Vaccinium scoparium* H.T. [*Picea engelmannii-* *A. lasiocarpa*/ *V. scoparium* H.T.] [*A. lasiocarpa*/*V. scoparium-* *Carex geyeri* H.T.]	Arapaho, Grand Mesa, Gunnison, Roosevelt, Routt, Uncompahgre, and White River National Forests	Cool dry	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii* *P. menziesii* *P. contorta* *P. tremuloides*	*V. scoparium* *L. borealis* *P. myrsinites* *V. myrtillus* *C. geyeri* *A. cordifolia*	Hess and Alexander 1986 Hess and Wasser[2] Hoffmann[3] Hoffman and Alexander 1980, 1983 Komarkova et al.[1]
Abies lasiocarpa *Calamagrostis canadensis* H.T. [*Picea engelmannii A. lasiocarpa*/ *C. canadensis* H.T.]	Gunnison, Arapaho, and Roosevelt National Forests	Cool wet	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii* *P. tremuloides*	*C. canadensis* *Vaccinium* spp. *Carex aquatilis* *Equisetum arvense* *Saxifraga arguta* *S. sericea*	Hess and Alexander 1986 Komarkova et al.[1]
Abies lasiocarpa *Carex geyeri* H.T. [*Populus tremuloides-* *A. lasiocarpa*/*C. geyeri* C.T.(GNF)] [*Picea engelmannii-* *A. lasiocarpa*/*C. geyeri* H.T.]	Arapaho, Grand Mesa, Gunnison, Roosevelt, Routt, Uncompahgre, and White River National Forests	Cool dry	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii* *P. contorta* *P. tremuloides*	*C. geyeri* *B. repens* *P. myrsinites* *A. cordifolia* *F. ovalis* (*F. virginiana*) *L. leucanthus* *V. americana*	Hess and Alexander 1986 Hess and Wasser[2] Hoffman[3] Hoffman and Alexander 1980, 1983 Komarkova et al.[1]

Abies lasiocarpa / ***Arnica cordifolia*** H.T.	Grand Mesa, Gunnison, and Uncompahgre National Forests	Cool dry to well-drained	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii* *P. contorta* *P. tremuloides*	*A. cordifolia* *R. montigenum* *Aquilegia coerulea* *Pedicularis racemosa*	Hoffman[3] Komarkova et al.[1]
Abies lasiocarpa / ***Erigeron eximius*** H.T.	Rio Grande, San Isabel, and San Juan National Forests	Cool moist	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii* *P. menziesii* *A. concolor* *P. tremuloides*	*E. eximius* (*E. superbus*) *Lathyrus* spp. *F. ovalis* (*F. virginiana*) *G. richardsonii* *M. ciliata* *V. canadensis*	DeVelice et al. 1986
Abies lasiocarpa / ***Mertensia ciliata*** H.T.	Rio Grande, San Isabel, and San Juan National Forests	Cool wet	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii*	*M. ciliata* *Carex bella* *C.leptosepala* *Cardamine cordifolia* *Mitella pentandra* *Senecio triangularis*	DeVelice et al. 1986
Abies lasiocarpa / ***Pedicularis racemosa*** H.T.	Grand Mesa and Uncompahgre National Forests	Warm dry	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii*	*P. racemosa* *A. cordifolia*	Hoffman[3]
Abies lasiocarpa / ***Polemonium pulcherrimum*** H.T.	Gunnison National Forest	Cool dry	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii* *P. contorta* *P. tremuloides*	*P. pulcherrimum* *Vaccinium* spp. *C.leptosepala* *Osmorhiza obtusa*	Komarkova et al.[1]
Abies lasiocarpa / ***Saxifraga bronchialis*** H.T. (Scree forest)	Rio Grande, San Isabel, and San Juan National Forests	Cool dry	*A. lasiocarpa* climax	*P. menziesii*	*S. bronchialis* *J. communis*	DeVelice et al. 1986
Abies lasiocarpa / ***Senecio triangularis*** H.T.; C.T.(GM & U NFs)	Arapaho, Grand Mesa, Gunnison, Roosevelt, and Uncompahgre National Forests	Cool wet	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii*	*S. triangularis* *A. cordifolia* *C. leptosepala* *E. arvense* *M. ciliata* *M. pentandra* *Streptopus fassettii*	Hess and Alexander 1986 Hoffman[3] Komarkova et al.[1]
Abies lasiocarpa / Moss H.T.	Gunnison National Forest	Cool dry	*A. lasiocarpa* co-climax with *P. engelmannii*	*P. engelmannii* *P. contorta* *P. aristata* *P. tremuloides*	Moss spp. Lichen spp. *Rosa* spp. *Vaccinium* spp.	Komarkova et al.[1]
			***Pinus aristata* series**			
Pinus aristata / ***Juniperus communis*** H.T.	Gunnison National Forest	Cool dry	*P. aristata* climax or co-climax with *P. engelmannii*	*P. engelmannii*	*J. communis* *A. uva-ursi* *Artemisia* spp. *M. montana* *P. fendleriana*	Komarkova et al.[1]
Pinus aristata / ***Ribes montigenum*** H.T. (Scree forest)	Rio Grande, San Isabel, and San Juan National Forests	Cool dry	*P. aristata* climax or co-climax with *P. engelmannii*	*P. engelmannii*	*R. montigenum* *S. bronchialis*	DeVelice et al. 1986
Pinus aristata / ***Festuca arizonica*** H.T.	Gunnison National Forest	Cool dry	*P. aristata* climax or co-climax with *P. engelmannii*	*P. engelmannii*	*F. arizonica* *R. cereum* *D. parryi* *K. cristata* *M. montana* *A. frigida*	Komarkova et al.[1]
Pinus aristata / ***Festuca thurberi*** H.T.	Gunnison, San Juan, Rio Grande, and San Isabel National Forests	Cool dry	*P. aristata* co-climax with *P. engelmannii*	*P. engelmannii*	*F. thurberi* *R. montigenum* *A. cordifolia* *P. pulcherrimum* (*P. delcatum*) *S. bronchialis*	DeVelice et al. 1986 Komarkova et al.[1]
Pinus aristata / ***Trifolium dasyphyllum*** H.T.	Arapaho National Forest	Cool dry	*P. aristata* climax	*P. engelmannii*	*T. dasyphyllum* *C. foenea* *A. lanulosa* *Penstemon whippleanus* *P. pulcherrimum* (*P. delcatum*)	Hess and Alexander 1986

[1]Komarkova, Vera, Robert R. Alexander, and Barry C. Johnston. Forest vegetation of the Gunnison and selected parts of Uncompahgre National Forests: A preliminary habitat type classification. (Menuscript in preparation.)

[2]Hess, Karl, and Clinton H. Wasser. Grassland, shrubland, and forestland habitat types of the White River-Arapaho National Forests. (Final report.) Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

[3]Personal correspondence with Dr. George R. Hoffman, Professor of Biology, University of South Dakota, Vermillion, S. Dak.

[4]Johnston, Barry C., and Leonard Hendzel. Examples of aspen treatment, succession, and management in western Colorado. (Report.) Rocky Mountain Region, Denver, Colo.

[5]Personal correspondence with David C. Powell, Silviculturist, Pike-San Isabel National Forests, Pueblo, Colo.

[6]Powell, David C. Aspen community types of the Pike and San Isabel National Forests. (Report.) Pike-San Isabel National Forests, Pueblo, Colo.

[7]Johnston and Hendzel,[4] and Powell[5,6] have recognized a Populus tremuloides/Ligusticum porteri habitat type. However, other investigators (Hess and Alexander 1986; Hess and Wasser[2]; Hoffman and Alexander 1980, 1983; Komarkova et al.[1]), who sampled more intensively, concluded that a P. tremuloides/L. porteri plant association probably represents a P. tremuloides/Thalictrum fendleri habitat type where a high water table or other circumstances cause L. porteri to dominate locally. Hoffman[3] recognized a L. portari phase of the P. tremuloides/T. fendleri habitat type.

Rocky Mountains

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Rocky Mountain Forest and Range Experiment Station

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